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TECHNOLOGY DEPT.
DETROIT

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JANUARY 29, 1944

Tin Fisherman

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A SCIENCE SERVICE PUBLICATION

MEDICINE

New Light on Arthritis

Adrenal glands seen as playing important role in causing rheumatic fever and other rheumatic conditions; cold, other glands may be involved.

➤ THE ADRENAL glands, vital organs lying just above the kidneys, may play an important part in causing rheumatic fever and other rheumatic conditions, Dr. Hans Selye, Miss Octavia Sylvester, C. E. Hall and Dr. C. P. Leblond, of McGill University, Montreal, declare. (*Journal, American Medical Association,* Jan. 22)

Overdosage with the hormone produced by the outer part of these glands under certain conditions produces a polyarthritis in rats which resembles that seen in acute rheumatic fever in humans, they report. Arthritic joint changes are more readily produced in the rats if, before the overdosage with the hormone, they have had their adrenal glands or their thyroid glands removed, especially if they are exposed to cold.

The effects of cold and of removal of thyroid and adrenal glands are in accordance with reports of the effects of cold and glandular disturbances in human rheumatic conditions, or of arthritis occurring during gland disorders, the Canadian scientists point out.

Exposure to cold, to infectious diseases, to emotional shock or similar nonspecific damaging agents may, they believe, stimulate the adrenal gland cortex to pour into the blood more of its powerful hormone. This is probably a defense mechanism, since the adrenal cortical hormone or hormones increase resistance in general.

Under certain conditions, however, the defense reaction may defeat its own purpose and produce changes in the joints or predispose the patient to rheumatic fever or to arthritic joint changes.

Whether and how this new knowledge can be used to treat or prevent arthritis and rheumatic fever is not stated in the report.

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ORDNANCE

Tanks Going Out?

➤ ARE TANKS on the way out?

These steel dragons that, teamed with swooping dive-bombers, enabled Hitler's hosts to slash successively through Polish, Franco-British and Russian armies, may have had their day, suggests Col. H. W. Miller of the University of Michigan engineering faculty. (*Army Ordnance,* Jan.-Feb.) Colonel Miller is a veteran student of ordnance, and is especially known for the research he conducted after the first World War on the long-range guns that shelled Paris in the spring of 1918.

Colonel Miller was moved to raise his challenging question by the fate of the Nazis' third summer campaign, which was intended to drive through and capture Moscow early in 1943. In two terrific weeks of fighting last June, 3,000 of the massive German tanks that spearheaded the attack were smashed, the loudly heralded campaign broke down, and the Red Army began the series of counter-offensives that are still in progress.

Successful defense against tanks may be put up with a variety of weapons, but in the use of all of them one prime factor is involved: soldiers with nerve and coolness enough to let the tanks get up close, or even to go through their lines, before letting fly. Molotov cocktails and sticky bombs are hand-flung weapons with a range of only a few dozen feet; bazooka rockets and 37 millimeter antitank guns are good for at most a few hundred yards. Even the high-velocity artillery pieces of three- and four-inch caliber, with potential ranges of six or eight miles, usually hold their fire until their clanking targets have closed to within a thousand yards or less.

It is useless, in Colonel Miller's opinion, to think of putting on thicker armor, for armor heavy enough to stop all attacks would emasculate the tank by reducing its speed, fire power and ability to cross soft terrain until the once mobile weapon has reached a point of near-uselessness.

To his question, "What follows the tank?" Colonel Miller does not offer a direct answer. His analysis shows that the tank, in World War I, offered the first promise of adequate protection to highly vulnerable human bodies advancing directly against hostile fire since the invention of gunpowder made personal armor useless. If that value of the tank has already been lost, as he suggests, tacticians are again confronted with the riddle they faced a generation ago: the apparent supremacy of the defense.

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MEDICINE

2½-Pound Stone Removed From Man's Bladder

➤ THE CASE of a man who had a two-and-one-half-pound bladder stone removed and recovered completely is reported by Dr. Frank J. Lepreau, Jr., and Dr. Ralph H. Jenkins, of Yale University. (*New England Journal of Medicine,* Dec. 16, 1943)

This is the largest bladder stone ever removed with complete recovery, so far as the doctors could find from an extensive search of medical records. The next largest on record weighed two pounds, six and one-half ounces. The record of this case did not state how the patient got along after leaving the hospital.

Largest bladder stone removed during life weighed four pounds, but the patient died 36 hours later.

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PHYSICS

Echo Sounder Locates School of Fish in Sea

➤ ECHO sounders are now used to locate schools of herring swimming 500 feet or more below the surface of the sea.

Primarily designed to sound depths for sea-going ships while navigating in shallow coastal waters, the echo sounders are now being tested for this use in British Columbia waters. They have already been in use for some time in Atlantic waters.

The echo sounder consists of a recording unit, a contactor unit, a transmitter and a receiver of high frequency sound impulse. Whether the sound impulse echoed from the school of fish is reflected from the bodies of the fish, from the mass of scales which are being shed, or from air bubbles which are given off continuously, is not yet known.

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ASTRONOMY

Titan's Atmosphere

Saturn's largest moon found to be surrounded by methane and possibly ammonia. Discovery may have indirect bearing on the origin of the solar system.

▶ THE ATMOSPHERE of the planet Saturn's largest satellite, Titan, consists of methane or marsh gas and possibly ammonia, Prof. G. P. Kuiper, of the McDonald Observatory of the Universities of Chicago and Texas, has discovered as the result of successfully photographing its spectra. Titan thus becomes the only moon in the solar system known to have an observable atmosphere.

This information is being transmitted by the Harvard clearing house to astronomers all over the world, as it has an important bearing on problems concerning the atmospheres of all planets and their moons as well as on the origin of the solar system.

Several decades ago, observations indicated that Titan, which is larger than the earth's moon in both size and mass, had an atmosphere, but the difficulty of getting satisfactory spectra prevented study of the constitution of such an atmosphere, if it really existed.

Now Dr. Kuiper's observations prove the existence of the atmosphere and show that it must have abundant quantities of methane, which is usually called marsh gas and is composed of one atom of carbon combined with four of hydrogen. Its atomic weight is about 16, while that of ammonia, composed of one molecule of nitrogen and three of hydrogen, is about 17. It is the relative heaviness of the atoms of these gases, when compared with hydrogen and helium, which enable them to cling to a moon of rather small surface gravity.

Of all the moons in the solar system —earth's one, Mars' two, Jupiter's eleven, Saturn's nine, Uranus' five, and Neptune's one—Titan would probably be most likely to retain an atmosphere. As Sir James Jeans pointed out over 20 years ago, the kinetic theory of gases demands that in a free atmosphere the lighter gases move most rapidly in order to carry their share of the equally distributed energy. Thus, hydrogen and helium, the lightest gases, move the fastest, and they are the first to begin to escape from a planet's atmosphere after it is formed. In the earth's case, the hydrogen has been retained mostly in combination with other elements, as with oxygen to form water, whereas oxygen, of atomic weight 32 in molecular form, and nitrogen, of atomic weight 28, have been retained in their molecular form as the main constituents of the atmosphere.

However, it has been the earth's gravitational pull which has prevented their escape, for they, too, move rapidly about. The heat of the sun increases the rate of their motion, so that more particles of all gases escape from the daytime side of the earth than from the night side. In the case of the moon, the atmosphere was probably thin in the first place, and the resulting intense heating of the surface by day must have long since caused almost all gases to escape. The moon's surface gravity is only 16% that of the earth, so its control over all but the very heaviest gases has never been sufficient for it to retain an atmosphere of observable amount. It might be expected that Titan, which has a surface gravity only 14% of the earth's, might have lost all trace of air, also. But Jeans points out the tremendous difference in the distance from the sun. Saturn is nearly ten times as far from the sun as is the earth. So the solar radiation received by our moon is 100 times as great as that received by Titan. Consequently, the temperature of Titan is very low, probably some 250 degrees below zero Fahrenheit, whereas on the moon, by day, 250 degrees above zero can be reached. On Titan, as well as on the planet Saturn itself, everything but methane must be frozen to the surface, whereas on the moon, even water has been boiled away. It is believed that clouds of ammonia droplets or particles are suspended in the methane atmosphere of Saturn, and this same arrangement may account for Dr. Kuiper's having found possible evidence of ammonia in the spectrum of the satellite itself.

Titan is Saturn's brightest satellite, and averages some 760,000 miles distant from the planet itself, requiring about 16 days to revolve around it once. Titan is about 2,600 miles in diameter and nearly two times the mass of the moon; it is exceeded in size only by two satellites of Jupiter, both of which are larger than the planet Mercury. However, they have comparatively low surface gravities, and no definite observations of atmospheres around them have been reported at present. Titan takes its place as the only moon in the solar system known to have an observable atmosphere.

Of great significance to astronomers is the fact that Titan's atmosphere appears to be similar to that of Saturn itself. This may indicate a common origin for the two bodies and also a similar constitution. However, Titan has a density about three and one-half times that of water, whereas Saturn itself is lighter than water, the only planet for which that is true. Saturn's low density is explained by assuming it to be composed largely of hydrogen. Atmospheres of methane and ammonia for both Jupiter and Saturn add to the evidence supporting this belief, and the finding of an atmosphere containing large amounts of hydrogen around Titan is further evidence along the same lines.

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DWARFED—In this photograph of the beginning of the Jan. 13 occultation of Jupiter by the moon, the planet appears to be much smaller than the moon, though actually it is more than 40 times as large. The picture was taken by the Camera Station of the Amateur Astronomers Association of the American Museum of Natural History.

MEDICINE

New Burn Shock Treatment

Having patients drink large quantities of sodium lactate solution proves successful, and does not require the use of blood plasma.

➤ SUCCESS with a new, simple method of saving victims of shock in severe burns without the use of blood plasma is reported by Dr. Charles L. Fox, Jr., of Columbia University College of Physicians and Surgeons. (*Journal, American Medical Association,* Jan. 22)

The only death in 23 patients with extensive third degree burns and three others with second degree burns occurred in a patient who had carbon monoxide poisoning and lung edema when admitted to the hospital and who died four hours later.

The new treatment for the shock phase of severe burns consists in having the patient drink large quantities of sodium lactate solution. No plasma is given. The patient gets about seven to 10 quarts of the solution within the first 24 hours. The patients quickly become accustomed to the taste and drink it copiously of their own accord.

Vomiting, which frequently occurs in severe burns, is treated by giving more fluid. Often a small tube is passed through the nose and connected with a drip apparatus so that the sodium lactate can be given constantly to the patient.

Reports of the Pearl Harbor disaster and the Cocoanut Grove fire in Boston have "indicated," Dr. Fox states, that mortality from severe burns is relatively high even when large amounts of blood plasma are used to fight shock. English experience has been the same. Studies by other scientists have shown that even large amounts of plasma do not always correct the concentration of blood following severe burns.

Salt (sodium chloride) and sugar solutions were formerly used to fight shock in severe burns, the solutions being injected into the veins. Results were disappointing. Recent experiments by Dr. Sanford M. Rosenthal, at the National Institute of Health, showed that sodium lactate solutions of somewhat different strength than the salt solutions formerly used, and given by mouth instead of into the veins, saved mice from severe burn shock. These experiments suggested that such solutions should be reconsidered.

The great military advantage of the sodium lactate treatment, if further studies confirm its success, is pointed out by Dr. Fox. Sodium lactate costs only a few cents. Since the patient drinks the solution, it is far easier and simpler to give and frees nurses and physicians for other duties than giving intravenous injections of plasma or serum.

Emergency use of this method when plasma is not available, he states, seems clearly indicated.

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MEDICINE

Foot-Bone Cancer Cured

Patient who was operated on 13 years ago now can walk miles and carry heavy loads without any discomfort. Cancer did not spread to chest.

➤ A 13-YEAR cure of cancer of a bone in the foot with multiple fractures of other metatarsal bones in the same foot is reported by Dr. Henry W. Meyerding, of the Mayo Clinic. (*Journal, American Medical Association,* Jan. 22)

The patient, a 15-year-old boy when first seen, is now a 190-pound man in perfect health. He is able to walk miles without any trouble and to do a full day's work in a shingle mill where he carries heavy blocks of wood all during the working hours.

The trouble started, Dr. Meyerding believes, with a broken metatarsal bone resulting from an accident in which a horse fell on the patient's right foot. The foot was crushed and held by a steel riding stirrup.

The foot swelled "like a watermelon" and for three weeks he was unable to walk on it. It did not feel right for two months after the injury. About two years later, while running, he felt something "give way" in the foot, and could hardly walk because of the severe pain. The physician he consulted took an X-ray picture and made a diagnosis of sarcoma (tumor) of the metatarsal bone.

When he came to the Mayo Clinic it was thought the condition was either in-

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flammation of the membrane covering the bone, a disease characterized by thickening of the bone, or cancer transferred from a tumor in the nose which had been removed some years before.

The patient's mother demanded an operation because of the home physician's diagnosis of sarcoma. The hard, spindle-shaped bony mass that was removed proved to be a bone cancer. The patient was given two X-ray treatments after the operation and 35 injections of Coley's toxins during the next few months.

Some months later he stepped on the operated foot with the other foot. X-ray pictures showed no recurrence of the sarcoma but what looked like another tumor of the next metatarsal bone. This bone was removed but the pathologist's examination showed that instead of another sarcoma, as had been expected, the trouble had been inflammation of the bone and an old fracture with callus.

The patient recovered and gained weight and continued to feel well. X-rays, taken to check on his condition, nine months later showed inflammation with apparent fractures of two more metatarsal bones. These later healed. An attack of athlete's foot was treated and a hammer toe corrected by surgical operation, since which time the patient has had no further trouble with his foot or leg and no recurrence of the sarcoma, nor any spread of it to the chest.

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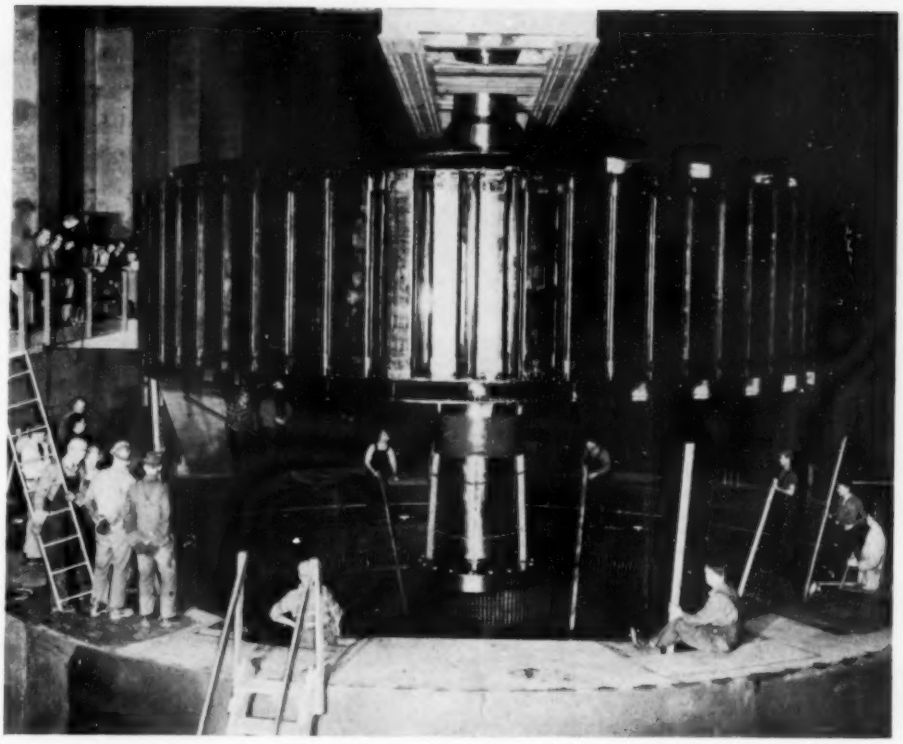

WAR WEAPON—This 535-ton rotor being lowered into place is at Grand Coulee Dam. Columbia River hydro-electric power from the Bonneville and Grand Coulee dams is turning out nearly one-third of America's aluminum and tremendous quantities of other vital war metals. In the construction of Bonneville Dam, giant fish ladders and elevators were provided to carry the Columbia's famous Chinook salmon to their spawning grounds upstream, and the world's highest single lift lock permits ocean-going vessels to travel up-river. Department of the Interior photograph.

PSYCHIATRY

Screening Mentally Unfit

New simple method devised for use in selecting men for the armed forces consists of three short tests. Spots 80% to 90% of men not suitable for the services.

➤ A NEW, quick and simple method for weeding out the mentally unfit among selectees for the armed forces is announced. (*Journal, American Medical Association,* Jan. 22) It was devised by Mr. Arthur Weider, Dr. Bela Mittelmann, Dr. David Wechsler and Dr. Harold G. Wolff, with the technical assistance of Miss Margaret Meixner, in studies at Cornell University Medical College, the New York Hospital and Bellevue Hospital.

The method consists of three tests which can be given to selectees one at a time or in groups. They take 15 minutes to complete and can be scored in two minutes by any one with high school education. The method of scoring can be learned in less than an hour.

On the first test the selectee marks on a list of occupations which ones he likes and which he dislikes. This test shows the selectee's range of interests, work preferences and acceptance of the male pattern. In a previous study certain occupations, such as interior decorator, dancer and window dresser were chosen by homosexuals with great frequency.

The second test shows the selectee's evaluation of himself. He indicates whether he thinks he would be "good," "poor" or is "in doubt" of his ability in managing specific situations. This test shows the amount of self-confidence, self-esteem and decisiveness.

The third test is a questionnaire used to show symptoms of maladjustment. Included are "stop questions," such as "Did you ever have a fit or convulsion?" They are stop questions because they show up major symptoms and any selectee showing them must be stopped for more intensive appraisal.

The selectee must have had the equivalent of a seventh grade elementary education to be able to take the tests.

The Cornell scientists advise using the tests at the stage when the men are having preliminary Wassermann tests by Selective Service authorities. The index obtained from the test would then become part of the man's history and would give the neuropsychiatrist at the induction station a picture of the selectee's neuropsychiatric state and enable him to arrive at a more accurate and effective decision than at present. The

tests could be given and stored at induction stations but this would be more costly in time and personnel.

In tests with several thousand men, the Cornell selectee index, as it is called, screened from 80% to 90% of men rejected by neuropsychiatrists or discharged from the Army and Navy because of performance and neuropsychiatric disability.

The index is effective in showing the presence of anxiety states, asocial trends, hypochondriasis, convulsive disorders, migraine, asthma, peptic ulcer and allied conditions. It focuses attention on borderline states which may be missed because they fall between other departmental classifications. It is less effective, the Cornell scientists state, in screening those likely to have conditions such as hysterical palsies, the pre-psychotic and early psychotic states and obsessive states.

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MEDICINE

Use of Oral Vaccines For Colds Not Advised

➤ WARNING that there is a recognized lack of scientific evidence for the value of cold vaccines taken by mouth and overwhelming evidence against their value, the *Journal of the American Medical Association* (Jan. 22) charges editorially that the current large scale prescription and sale of them is an "indication of irresponsibility on the part of some manufacturers of pharmaceuticals."

"Individual physicians and firms who deal in pharmaceuticals," the warning continues, "and who lend themselves to wholesale uncontrolled distribution of such preparations are perpetrating an unwarranted commercial assault on the public pocketbook."

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EDUCATION

Mexico Plans to Stress Technical Education

➤ MEXICO'S new secretary of education, Jaime Torres Bodet, in his inaugural statement has declared that Mexico needs more technically trained workers and scientists able to solve with modern efficiency various problems of the country. In his plans for the development of his department, he will emphasize the development of technical education.

A well-known poet and scholar, Secretary Torres Bodet also has cooperated in scientific developments in Mexico.

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GENERAL SCIENCE

40 To Meet in Washington

The 12 girls and 28 boys (proportion determined by ratio of boys and girls entering the contest) are being invited on all-expense trips to Washington, D. C., March 3 to 7, 1944, to attend the Science Talent Institute, where one boy and one girl will be awarded $2,400 Westinghouse Grand Science Scholarships, 6 boys and 2 girls will be awarded $400 Westinghouse Science Scholarships, and $3,000 additional in scholarships will be awarded.

	ALABAMA
Anniston	Jenkins, Rodman 14 Anniston High School
Birmingham	Stelzenmuller, Cyril Vaughn 15 West End High School
	ARIZONA
Tucson	Fickett, Wildon 16 Tucson Senior High School
	CALIFORNIA
Tahoe	Hinkle, Richard Gordon 16 Tahoe Br. Placer Union High School
	DISTRICT OF COLUMBIA
Washington	Durant, Nancy Agnes 15 Dunbar High School
	Poirier, Jacques Charles 16 Woodrow Wilson High School
	FLORIDA
St. Petersburg	Hardy, George Fiske 16 St. Petersburg Senior High School
	GEORGIA
Atlanta	Honour, Nan 17 Girls High School
	ILLINOIS
Edwardsville	Springer, Eleanor Jane 17 Edwardsville High School
LaGrange	Mottelson, Ben Roy 17 Lyons Township High School
	MICHIGAN
Hazel Park	Rozian, Irving William 17 Hazel Park High School
	NEW HAMPSHIRE
Exeter	Ford, Kenneth William 17 Phillips Exeter Academy
	NEW JERSEY
Atlantic City	Tschudy, Donald Paul 17 Atlantic City High School
Millburn	Marrison, Joyce Mildred 17 Millburn High School
Passaic	Green, Leon William 17 Passaic Senior High School
	NEW YORK
Brooklyn	Daniels, Gilbert Samuel 16 Brooklyn Technical High School
	Jaffe, Lionel Francis 15 Erasmus Hall High School
Garden City	Newcomb, William Adrian 16 Garden City High School
Manlius	Mayper, Victor, Jr. 15 The Manlius School
Marlboro	Bond, Mary Ruth 17 Marlborough Central High School
New York	Hagopian, Anne 16 The Brearley School
	Gerstenhaber, Murray 16 Bronx High School of Science
	Zablow, Leonard 16 Bronx High School of Science
	Irving, Ellen Mary 15 Walton High School
Rochester	Dunkel, Patricia Ann 17 Brighton High School
	Houck, Theodore Edwin 17 Brighton High School
Rome	Dyett, Edmond Granger, Jr. 15 Rome Free Academy
Roslyn Heights	Howlett, Eric Mayorga 16 Roslyn High School
Staatsburg	Thompson, Steadman 18 The Anderson School
Whitesboro	Baird, Joan Audrey 17 Whitesboro Central School
	OHIO
Mt. St. Joseph	Deiters, Rosemary Julia 17 Mt. St. Joseph Academy
	PENNSYLVANIA
Elkins Park (Phila.)	Kraichnan, Robert Harry 15 Cheltenham High School
Overbrook (Phila.)	Earle, Albert Porter 16 Friends' Central School
Pittsburgh	Hershenson, Lee Morton 16 Taylor Allderdice High School
	WEST VIRGINIA
Williamson	Slaven, Nancy Waddell 17 Williamson High School
	WISCONSIN
Fennimore	Miles, Ruth Hulda 17 Union Free High School
Madison	Butler, Charles William 17 West High School
	Noland, Wayland Evan 17 Wisconsin High School
Milwaukee	Corr, Royal Marden 17 Whitefish Bay School
	WYOMING
Lyman	Davidson, Amber Charles 17 Lyman High School

EDUCATION

Talent Search Winners

Twelve girls, 28 boys are awarded trips to Washington to attend Science Talent Institute. One boy and one girl to receive $2,400 grand scholarships.

➤ TWELVE GIRLS and 28 boys have been invited to Washington, March 3 through March 7, to compete for the Westinghouse Science Scholarships in the Third Annual Science Talent Search conducted by Science Clubs of America, administered by Science Service. They will spend five days together at the Science Talent Institute in Washington.

The names of the trip winners were announced by the judges as the result of a strenuous competition in which superior seniors of all secondary schools in the United States were invited to participate. The 40 winners were selected from about 15,000 entrants. About 3,000 of these students completed a science aptitude examination, submitted recommendations and scholarship records and wrote an essay on "My Scientific Project."

The trip winners come from 33 localities in 15 states and the District of Columbia. Entries were received from every state in the union.

Those who come to Washington for the Science Talent Institute in March on the all-expense trips, will compete for scholarships which will allow them to go to any college, university or technical school of their own selection to continue science or engineering training. One boy and one girl will be awarded $2,400 Westinghouse Grand Science Scholarships ($600 a year for four years), while 6 boys and 2 girls will be awarded $400 Westinghouse Science Scholarships ($100 a year for four years), and $3,000 more in Westinghouse Science Scholarships will be awarded at the discretion of the judges.

Selected without regard to geographic consideration, the results show that this year winners come from some states that have not had winners before. Alabama, Arizona, Georgia, and the District of Columbia have winners this year for the first time.

Only two schools in the United States have produced more than one winner this year. They are: Brighton High School, Rochester, N. Y., and the Bronx High School of Science, Bronx, N. Y. Each of these schools will send two winners to the Science Talent Institute.

Eight schools have had winners in other years and have been able to place winners again this year. They are: Phillips Exeter Academy, Exeter, N. H.; Brooklyn Technical High School, Brooklyn, N. Y.; Bronx High School of Science, Bronx, N. Y.; Walton High School, Bronx, N. Y.; Garden City High School, Garden City, N. Y.; Rome Free Academy, Rome, N. Y.; Taylor Allderdice High School, Pittsburgh, Pa., and West High School, Madison, Wis.

Washington, D. C., Brooklyn, N. Y., New York, N. Y., Rochester, N. Y., Philadelphia, Pa., and Madison, Wis. will send two or more winners each but except in two cases they are not from the same high school within the city.

Most of the winners live at home and attend their local public or parochial high school. Five, however, are enrolled in private schools and three go to school some distance from their homes. Their homes are in Cleveland Heights, Ohio, New York, N. Y. and Columbus, Ohio.

More than half, 68% or 27 of the 40, of the Science Talent Search trip winners ranked first or second in their graduating classes.

Twenty-eight of the winners are members of science clubs and at least seven of them are presidents of their clubs.

Many of the trip winners already have chosen their field. Their choices range from naval architecture to biochemistry. Eleven hope to do research in the fields of biology, chemistry, medicine or physics. Three hope to be electronic engineers. Two hope to be theoretical chemists and one a mathematical physicist. Radio and chemical engineering and medicine are choices of careers for four others.

The proportion of boys and girls who submitted completed entries in the Science Talent Search determined the distribution of boys and girls among the trips awarded. Girls accounted for 31% of the entries this (*Turn to page 76*)

MOVIE CAMERA—This instrument, called a phototheodolite, was designed to facilitate the testing of airplanes during take-offs, landings, dives and other maneuvers involving a knowledge of flight path, altitude and velocity. The camera photographs the airplane, a time counter, and elevation and azimuth angle scales simultaneously. The operator's assistant, at the right, maintains contact with the airplane by radio. This is an official photograph of the National Advisory Committee for Aeronautics.

ORDNANCE

Sound Camouflage Uses Decoy Cannon-Flashes

➤ IN EARLY STAGES of the Pacific war, the Japs used to set off strings of firecrackers to fool Allied troops into thinking machine-guns were in action against them. The same idea, though more elaborate, underlies a compact, easily carried apparatus for producing fake cannon-flashes and explosions, on which two Milwaukee inventors, Alfred Groth and H. J. Hanauer, received patent No. 2,338,762. The object is to get the enemy to direct his bombers or artillery fire on the wrong spots.

Into a short, wide-mouthed firing barrel, plastic-coated round pellets of powder are dropped, one by one, from a tubular magazine. As they fall to the bottom they are exploded by electrical means. Various sizes of powder pellets may be used to imitate different types of artillery fire. A small battery-driven motor regulates the rate of release from the magazine. The whole operation is automatic; the soldier in charge just sets it down, closes the switch, and then gets rapidly out of the neighborhood while Jerry or Jiro starts banging away at the imagined field piece or mortar.

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PUBLIC HEALTH

Okay to Tell Your Soldier To Wear His Leggings

➤ THAT WELL-NIGH irresistible and universal maternal trait of telling sons, from five to 50 years old, to wear their overshoes when it rains and to guard their health in other ways gets a figurative pat on the back from no less a medical authority than Maj. Gen. Norman T. Kirk, Surgeon General of the U. S. Army.

Mothers and also wives, sisters, sweethearts and other home folks, he believes, can help the Army keep the soldiers in good health by writing on the general subject in their letters.

The Army, it appears, is somewhat in the position many a mother finds herself when Junior—or his Dad—persists in going out on rainy days without the fine new umbrella she has bought for his protection.

"Sometimes soldiers are inclined to think the wearing of gloves and leggings through the jungle is 'sissy,'" General Kirk said. "Yet the realistic fact is that simple protective measures outlined to every man going into foreign areas are highly important to his continued good health. A fighter knocked out by the Anopheles mosquito is just as much a casualty as the one who stops a Japanese bullet.

"Soldiers cherish their letters and read them over and over," he continued. "If these letters urge them to understand the necessity for continuous vigilance against disease, they will gradually absorb the warning. They will come to use their mosquito weapons as automatically and as effectively as their rifles."

The fatality rate from disease and injury in the Army is lower than it has ever been despite the fact that personnel are scattered to virtually all parts of the globe, General Kirk said. There have been no epidemics among soldiers overseas, but to maintain this record, he declares, eternal vigilance is necessary.

Science News Letter, January 29, 1944

PUBLIC HEALTH

Underground Tubes May Be Used to Collect Trash

➤ NO GARBAGE MAN, no trash man, no ash man will make weekly rounds with dusty, dirty ill-smelling trucks in American cities of the future. This is not a certainty but it is a reasonable possibility. Already, in many homes, kitchen grinders chew up garbage so that it can be flushed into the sewage system. Next may come underground pneumatic tubes to suck household wastes and ashes to central stations, Morris M. Cohn, city sanitary engineer for Schenectady, suggested at the meeting of the American Society of Mechanical Engineers in New York.

"Engineers vision the time when dry rubbish and ashes will be sucked away from homes through underground pneumatic tubes, like subways, which will completely eliminate the storage and handling of these wastes and their surface collection," he said.

"The system would consist of a network of pneumatic ducts under every street of the city, with a connection in every home, store and industry. An airlock chamber will permit the property owner to discharge ground-up wastes into the city's refuse 'veins' from whence they would be sucked to an incinerator which would burn the debris and produce heat and power for the community."

Science News Letter, January 29, 1944

IN SCIEN

CHEMISTRY

Ozone Protects Meat From Spoiling in Storage

➤ MEAT is protected against spoilage, and the close-rationed supply thus made to stretch that much farther, by an ozone treatment on which U. S. patent No. 2,339,507 has just been granted to two research scientists of the Westinghouse Electric & Manufacturing Co., Dr. Rudolph Nagy and Dr. Harvey C. Rentschler.

Value of ozone as a discourager of the bacteria and molds that spoil stored meat has long been recognized, but it has been difficult to supply it in correctly controlled concentrations. A little of this peculiar and potent form of oxygen goes a long way, yet too much of it would not be good for the meat.

The two scientists have met the difficulty by feeding a constant but small supply of ozone into the conditioned air that is circulated in the space where the meat is stored or is undergoing tenderization treatment. The ozone is generated preferably by means of an ultraviolet lamp placed in an air duct. Ultraviolet radiation converts ordinary oxygen into the short-lived tri-atomic molecules of ozone. To make certain that the ozone concentration does not rise above the desired low figure, a chemically treated glass-wool filter is introduced into the air circuit, with automatic means for throwing it into or out of action as necessary.

Science News Letter, January 29, 1944

ENGINEERING

Automatic Alarm Devised For Railroad "Hot Box"

➤ AN AUTOMATIC electrical system for giving alarm when the axle bearings on railroad cars become overheated has been devised by Leigh J. Stephenson of Markham, Ill. As all railroad men and most travellers know, these "hot-boxes" are about the most frequent causes of train delays, and have also been responsible for some very bad wrecks. Rights in patent No. 2,339,436, issued on this invention, are assigned to the Pullman-Standard Car Manufacturing Company.

Science News Letter, January 29, 1944

NE FIELDS

ELECTRONICS

"Electronic Ear" Tests Small-Caliber Shells

➤ AN "ELECTRONIC EAR," to match the well-known "electric eye," is now used in ordnance plants to test the shells for the deadly little 20-millimeter automatic cannon which some of our fighter planes carry and with which the secondary armaments of our warships bristle. (*Army Ordnance,* Jan.-Feb.)

"Sonotest" is the convenience-name that has been given to the device, which tells whether or not shells are sound, and therefore safe to load and use, by the way they ring when dropped on an anvil. It is a variant of the old shopkeeper's trick of tossing coins on the counter to hear whether they "ring true"; as a matter of fact, that was the purpose for which it was first devised.

Properly made shells, without cracks and with their copper rotating bands well seated, will have a certain vibration frequency, or range of tone. Also, perfect shells will ring longer than cracked or misbanded ones. The sound is picked up by a microphone, and the resulting electrical oscillations fed through a hook-up of electronic tubes. Suitable relays light green "go" lights if the shell is good, and warn the operator to discard imperfect specimens.

Each shell is tested twice: once by dropping it on its bottom, again by dropping it on its side. With a little preliminary training, a girl operator can test from 1,200 to 1,800 shells an hour.

Science News Letter, January 29, 1944

ENGINEERING

1945 Streetcars May Let Standing Passengers See

➤ STREETCARS of 1945 may make less noise, look better and permit passengers who have to stand to see out, as the result of investigation of possible improvements now under way.

The study will consider both the car rider and car operator, according to a report made by A. H. Leschke to the American Transit Association. Passenger convenience and comfort, greater reliability of the streetcar itself, further elimination of noise, improved appearance, reduction in weight, and lower maintenance and operating costs will all be considered.

Comfortable arm rests, new facilities for ventilation, center doors located farther toward the rear to facilitate passenger movement, and standee windows, so that passengers who have to stand can see out and know when the desired stop is approaching, are among the many improvements being considered.

Ten years have elapsed since the appearance of the first streamlined car of the "President's Conference Committee" type, which are smoother and quieter than was ever considered possible for a streetcar. Numerous minor improvements have been made since 1935, but few radical changes.

Several months ago work was started on a study of the entire design of the PCC car so that improvements which ten years of experience would indicate as desirable would be incorporated.

Science News Letter, January 29, 1944

METALLURGY

Nickel-Plated Steel Wire Replaces Solid Nickel

➤ NICKEL-PLATED steel wire is now being used in this country in place of solid nickel wire for the supports for tungsten filaments in incandescent lamps. The purpose of the replacement is to save war-essential nickel. Approximately 600,000 pounds of virgin nickel metal was consumed annually in the United States before the war in making fine nickel wire for this purpose. With the new wire much less will be required.

Several European countries have been using nickel-plated wire for the support of the tungsten filaments during the past decade or so, according to James H. Conolly and Richard Rimbach of the Hanover Wire Cloth Company, located at Hanover, Pa. They explained the process of the continuous electroplating fine steel wire for use in electric lamps at the Chicago meeting of the Electrochemical Society.

The tungsten filament support and lead in an incandescent bulb is composed of three sections; the support section inside the bulb, the sealed-in section, made of copper-clad nickel-steel wire, passing through the glass wall, and the outer copper section which makes soldered contacts with the brass base. Normally the different metals are joined by welding. The nickel-plated steel wire is in contact with the tungsten.

Science News Letter, January 29, 1944

PALEONTOLOGY

200-Million-Year-Old Jaw Of Large Reptile Found

➤ AN EXCEEDINGLY toothy fossil jaw (20 inches; 53 teeth), found in a Montgomery County quarry, a short distance outside of Philadelphia, tells of a race of ten- to twenty-foot crocodile-like reptiles that haunted swamps and lakes of the neighborhood some 200 million years ago, in the Triassic period.

Rescued just in the nick of time from the jaws of a modern monster, a stone-crusher, the rock containing the embedded fossil was taken to the Philadelphia Academy of Natural Sciences. There the fossil was identified by Dr. Edwin H. Colbert as being the jawbone of a Clepsysaurus.

This was a genus of reptiles that looked and probably lived very much like crocodiles, but were nevertheless not ancestral to modern crocodiles. They were leading citizens of the animal world in remote days when the later reigning family, the dinosaurs, were still relatively small and inconsequential. The whole great group to which it belonged, known collectively as the phytosaurs, died out as the dinosaurs increased in power and authority. Later still, true crocodiles (and their American cousins, the alligators) appeared and survived to become the largest reptiles in our own time.

Science News Letter, January 29, 1944

INVENTION

Cushion of Foam Provides Shock-Absorber for Boats

➤ SMALL, high-speed boats slamming their way through rough water hit waves with almost as much shock as if they were solid instead of liquid, with resulting loss of maneuverability, not to mention discomfort to the occupants. Avoiding this is the objective of the invention on which patent No. 2,337,787 was awarded to William Waller, Jr., of Chicago.

Mr. Waller places a perforated shield of metal over the entering portion of the bow, with a separating space between it and the hull. Jets of water spurting through the holes are directed sternward by means of baffles or short tubes. The inventor claims that this device gives the boat a cushion of foam, which breaks the shock of hitting green water, yet does not reduce speed.

Science News Letter, January 29, 1944

ASTRONOMY

Jupiter Prominent

Giant planet makes close approach during February. Star maps may be mounted in box, illuminated from the back, with pinholes through stars to aid study.

By JAMES STOKLEY

➤ THE PLANET Mars, which has been so bright in the evening sky during recent months, is receding from the earth and is diminishing in brilliance. In its place Jupiter, even more brilliant than Mars was at its maximum, is now coming into prominence as it makes a close (for Jupiter) approach to the earth. The accompanying maps give the appearance of the skies about 11:00 p.m. War Time, on Feb. 1, or an hour earlier in the middle of the month. Jupiter is visible in the southeast, close to the star Regulus, in Leo, the lion. Regulus marks the end of the handle of the sub-group called the sickle.

Jupiter now rises about sunset, and is visible all through the night. On the night of Feb. 8 it will be seen close to the moon, which will then be full. From the western United States, the moon will actually pass in front of Jupiter, just as it did for more easterly states on the morning of Jan. 13. (*See page 67*)

The other two planets of the February evening are high in the southwest, in the constellation of Taurus. These are Mars and Saturn, with the latter now slightly brighter. Look for the red star Aldebaran, which marks the eye of the bull. This is in a V-shaped aggregation of stars, known as the Hyades. The two planets are now almost in a position to mark the continuation of the arms of the V, with Saturn to the left and Mars to the right. Mars is red in color, another point which will aid in distinguishing it from its neighbor.

Below Saturn is the magnificent constellation of Orion, the warrior, of which the most conspicuous stars are Betelgeuse and Rigel. Between them is the row of three stars forming Orion's belt. Below and to the left of Orion is Canis Major, the great dog, with Sirius, the dog star, the closest bright star seen from the United States and Canada.

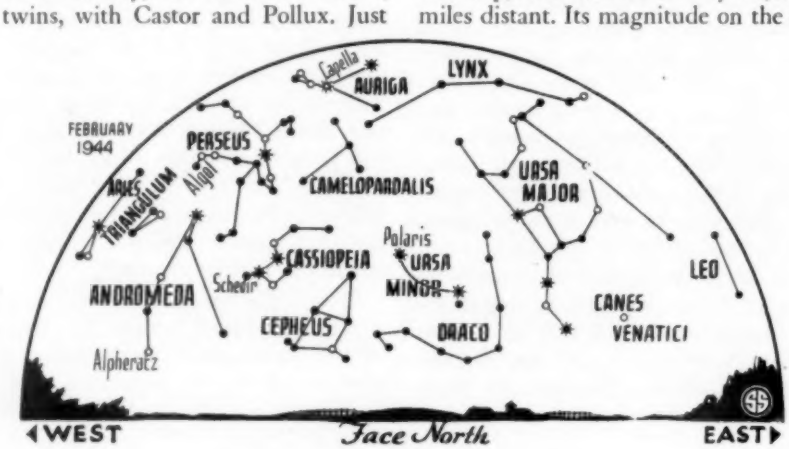
Just to the left of Canis Major is the group marked Puppis on the map, which is not one of the dog's pups! Puppis means the poop, an old term for the stern of a ship, for this is part of the great constellation of Argo Navis, the great ship that carried Jason and the Argonauts on their voyages in quest of the golden fleece. Pyxis, the compass, is another part of this group, which is so big that it is subdivided into four sections. The others are Vela, the sails, and Carina, the keel. These contain brighter stars than any in the parts of Argo that we can see. But although we cannot see these stars, many of our friends and relatives are looking at them now, for they ascend high in the heavens for the boys in the South Pacific.

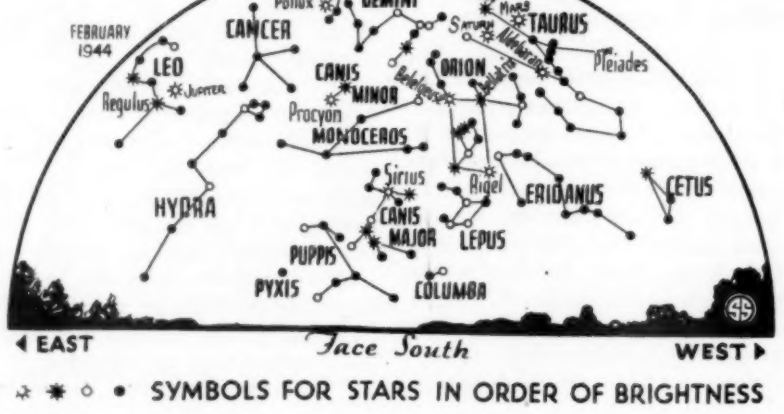
Above Canis Major is the faint constellation of Monoceros, and above this is the lesser dog, Canis Minor, with the star Procyon. Ascending still higher in the southern sky, we come to Gemini, the twins, with Castor and Pollux. Just north of Mars and Saturn is Auriga, the charioteer, containing the first magnitude star Capella.

To the north, the great dipper, part of Ursa Major, the great bear, is swinging up in the northeast, the dipper's handle hanging downwards. The two stars in the upper part of the bowl are the pointers, and following them to the left we come to the pole star, Polaris. On the opposite side of the pole is Cassiopeia, the queen.

One more planet is visible during the night. This is Venus, which appears low in the southeast nearly two hours before sunrise and is more brilliant even than Jupiter. However, Venus is drawing towards the sun and, like Mars, is not as prominent as it was a month or so ago.

The variation in brightness of the planets is largely due to their changing distance from the earth. Thus, on Nov. 28, Mars made its closest approach of this trip, and was then only 50,120,000 miles distant. Its magnitude on the astro-





SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

nomical scale was minus 1.6, about the same as that of Sirius. Now, however, it has receded to a distance (on Feb. 1) of 82,591,000 miles. Its magnitude has dropped to 0.3. (The fainter a star or planet, the bigger is its magnitude number.) On the other hand, Jupiter is now relatively close, for on Feb. 11 both that planet and the earth are in the same direction from the sun, and the distance between us is least. On Feb. 1 the distance of Jupiter is 407,000,000 miles, while on the 11th this will drop to 405,500,000 miles. Jupiter's magnitude is minus 2.1.

Saturn was in opposition (in the same direction as the earth from the sun) on Dec. 15, and was then 748,000,000 miles away, with a magnitude of minus 0.3. Now it has receded to 778,340,000 miles, and its brilliance has dimmed to magnitude 0.1. Venus, likewise, is drawing away and is now at a distance of 113,400,000 miles, with magnitude minus 3.4. Last Oct. 13 its brightness was at a maximum, with minus 4.3. At that time its distance was 40,383,000 miles. In the case of Venus, however, there is another factor which determines the apparent brilliance and tends to counteract the effect of increasing distance. Like the moon, Venus changes phase, and when it was so bright last October it was a crescent. Now it is in a gibbous phase, like the moon between first quarter and full, so while it is farther away we can see more of the sunlit surface. Otherwise, it would now be much fainter.

Two books to guide beginners in finding the stars that have appeared in the last year or so make use of maps in which the stars are to be punched with pinholes and illuminated from the back for a realistic effect. One of these is *The Pin-Point Planetarium* by Armand N. Spitz, and the other is *The Star Finder,* by Henry M. Neely. This is not a new idea, as I have a set of cards made in England over a century ago using the same method, and nearly three and a half centuries ago a German astronomer named Weigel made a globe of the stars with pinholes representing them.

One of the readers of this department, G. W. Bailey, Jr., of Weston, Mass., writes me that he has used the accompanying maps in a similar way. At the time he wrote he was an aviation cadet, and he said that it helped him locate the stars he required for his studies of navigation. Perhaps others will be interested in his method.

"I put a light bulb inside a medium-sized cardboard box," he says, "and cut an opening in one end just the size of one of your charts. Then I clipped a chart to a piece of cardboard and with a needle pricked holes through the chart and the card to correspond to each star. Larger holes make brighter stars. When I put the cardboard over the opening in the box, I have the hemisphere of the sky before me. Of course a spherical sky can't be truly represented on a flat surface, but the effect in a dark room is pretty realistic. It only took me a few minutes to rig up this arrangement, and it has given me much enjoyment."

Celestial Time Table for February

Feb.	EWT	
1	3:08 a. m.	Moon in first quarter.
3	2:22 a. m.	Moon passes Mars.
4	2:42 a. m.	Moon passes Saturn.
9	1:29 a. m.	Full moon.
	7:27 a. m.	Moon passes Jupiter.
10	3:00 a. m.	Moon farthest, 252,500 miles.
11	6:00 p. m.	Jupiter nearest, distance 405,500,000 miles.
12	4:24 a. m.	Algol (variable star in Perseus) at minimum brightness.
15	1:14 a. m.	Algol at minimum.
17	3:42 a. m.	Moon in last quarter.
	10:03 p. m.	Algol at minimum.
20	6:52 p. m.	Algol at minimum.
21	3:54 p. m.	Moon passes Venus.
23	7:00 p. m.	Moon nearest, 221,700 miles.
	9:59 p. m.	New moon.

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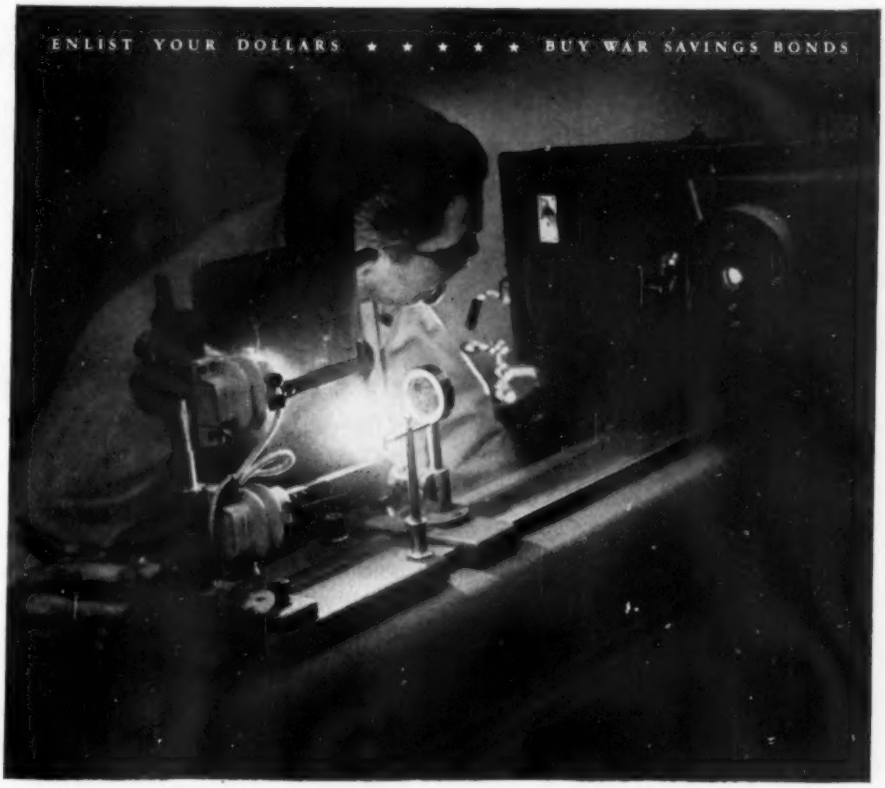

The Spark that Lights the Flame of Victory

A pinpoint of fighting metal placed in the arc of the spectrograph writes its own signature on a photographic plate. Inside the instrument, the light from that flame is broken up by a prism as a prism breaks up sunlight. Each element identifies itself by a series of characteristic lines, always the same for the same basic element. It reveals to the spectrographer each constituent, what impurities are present and in what quantities.

Thus spectrography helps in control and inspection. It keeps tough fighting steels tough, helps in development of new fighting metals. Spectrography is used, too, in other fields to speed research and analysis... chemicals, foodstuffs, vitamins.

Because Bausch & Lomb had long experience with such precision optical equipment, it was ready for quantity production of gunfire control instruments, binoculars and aerial photographic lenses. When the last gun is fired, Bausch & Lomb will devote its enlarged experience to peacetime optical production.

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Do You Know?

Mammals are the only animals that have hair.

About 350,000 city high school boys and girls helped on *farms* last summer.

Some *coal mining* in central Chile is complicated by the location of coal beds under the sea.

Fossil camels found in North America show that some of the family were 15 feet in height and others were the size of jackrabbits.

The percentage of Army motor *vehicles* in the United States which are in repair shops for periods longer than four days is less than 4% of the total.

Coke is now being produced in Utah from the Geneva coal mine in the southeastern part of the state, for a steel plant near Provo which will supply ship plates for West Coast shipbuilding.

More than 500,000 barrels of *oil* a day are being delivered to the eastern states now than a year ago; the "Big Inch" pipeline is responsible for three-fifths of the increase, tankers for the rest.

Camel hide is used to make leather for shoes and harness, camel hair is woven into cloth, camel milk is a highly prized food, and camel flesh from a young animal is a delicate meat, tasting somewhat like veal.

A *drilling rig*, which got mired in the mud en route to Kansas after an unsuccessful exploratory trip for lead and zinc in Oklahoma, was set up and put to work on the spot; the result was the discovery of a rich ore field.

Range *fire* destruction on federal grazing lands in 10 western states in 1943 covered less than half the acreage burned over in 1942, due largely to better organized and equipped fire crews; the 1943 burned-over area was 837,000 acres.

The Bureau of Reclamation has started on a preliminary outline for a post-war *public works* program calling for the expenditure, for irrigation and power developments in 17 western states, of perhaps $3,000,000,000 over a period of five or ten years.

From Page 71

year, in comparison to 26% last year, and 22% in the case of the First Search. The scholarships, with the exception of the two grand scholarships, will be distributed among boys and girls in the same ratio.

"A major need for America today is the discovery and development of scientific ability among boys and girls now in high school," the Science Service announcement states. "Real ability for creative research and engineering is rare. Many who do not now have the opportunity to develop their scientific talents will be discovered and made available for America's future progress through this Science Talent Search.

"This is more than a scholarship contest. It is a major step toward making available potential scientific talent to important tasks in war and peace. Within the next five years, either in war or peace, boys and girls now in high school must begin to take leadership in scientific research and engineering."

The Annual Science Talent Search is conducted by Science Service, 1719 N St., N. W., Washington 6, D. C., as one of the activities of Science Clubs of America. Awards are provided and the Science Talent Search made financially possible by the Westinghouse Electric & Manufacturing Company, a leader in scientific research, engineering and manufacture in the electrical industry, as a contribution to the advancement of science in America.

Science Service is the non-profit institution for the popularization of science, with trustees nominated by the National Academy of Sciences, National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Science Clubs of America, administered by Science Service, today has more than 4,000 affiliated clubs, with a membership of more than 100,000.

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MATHEMATICS

World Unified by 1950?

➤ IT IS not at all improbable that the whole world will be united under one government by 1950, a study of the trend throughout the ages toward larger and larger empires reveals.

Conquest by land alone could never have attained world-wide unification. But conquest by both land and sea might have brought the world under one power about 800 years from now, Dr. Hornell Hart, Professor of Sociology at Duke University, states. The use of air power, however, seems destined to bring about a world federation in the near future, mathematical studies show.

"Statistical evidence indicates clearly that the trend for thousands of years has been toward larger and larger governmental areas," states Dr. Hart, whose studies reveal that the areas of empires have been growing at ever-increasing rates of speed.

Since the dawn of history one empire after another has broken all previous records for territory administered by one ruling authority, Dr. Hart states. Studying the largest regions under one rule for different periods of history, he finds that even in prehistoric times the areas controlled by individual governments were increasing in size at accelerating rates.

The maximum area controlled by a single political organization around 50,000 B.C. the Duke professor estimates to be about 7,000 square miles, while in 5,500 B.C. the greatest region under one rule was probably 22,500 square miles.

From 5,500 to 750 B.C. the size of the most extensive political organizations increased about 154 square miles per year. In 750 A.D. the Saracen Empire included about 4,300,000 square miles.

When both land armies and fleets were used in extending power, the regions under one rule became increasingly greater. If these sea-borne empires had continued to grow at the rate of 46,750 square miles per year, Dr. Hart estimates, the total land area of the world would have come under one government by about 2750 A.D.

The territory seized by Japan was the first empire established through major use of air power. The area of this empire in October, 1942, totalled approximately 2,640,000 square miles.

Mathematical analysis reveals that the increase in production of aircraft, speed of world travel and maximum range of projectiles has already exceeded the rate of acceleration required to attain a world-wide government as early as 1950.

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BIOGRAPHY

Psychology Pioneer Dies

Dr. J. McKeen Cattell, dean of American psychologists, editor and founder of several scientific journals, and contender for freedom of teaching, dies at age of 83.

DR. J. McKEEN CATTELL

➤ ONE of the outstanding figures in American science passed from the stage where he had taken many important roles, with the death in Lancaster, Pa., early on the morning of Thursday, Jan. 20, of Dr. J. McKeen Cattell, at the age of 83. Pioneer in experimental psychology, contender for freedom of teaching, publisher of half-a-dozen scientific journals, dominant figure in the councils of leading learned societies, successful businessman and executive, Dr. Cattell will be remembered with respect by thousands of persons whose careers he has influenced.

Dr. Cattell was born at Easton, Pa., on May 25, 1860. He was graduated from Lafayette College in 1880. He carried on his graduate studies at the University of Leipzig, in the days of real German greatness in the field of scholarship, receiving his Ph.D. in 1886. There he was indoctrinated in the then new and revolutionary concept of psychology as a science of experiments and measurements, rather than an introspective examination of the state of one's own consciousness. After one-year lectureships at the University of Pennsylvania and Bryn Mawr College (1887) and Cambridge University (1888), he held the world's first professorship in psychology, at the University of Pennsylvania, from 1888 to 1891. In 1891 he went to Columbia University, where he remained for a long and active teaching and research career, until 1917. Men who studied under him there have given the science of psychology in America its main outlines.

Career enough for even an extraordinary man, this high university post was not enough to occupy all the energies of Dr. Cattell. He took over the editorships of three struggling journals, *Science, The Scientific Monthly* and the *American Naturalist,* and made successes of them. *Science* and *The Scientific Monthly* are now the official publications of the American Association for the Advancement of Science. He founded two professional journals himself: the *Psychological Review* and *School and Society.* He also began the publication of *American Men of Science,* which is the scientist's *Who's Who,* and of a similar directory of schoolmen, *Leaders in Education.*

Among his business ventures have been the Psychological Corporation, of New York, and the Science Press, of Lancaster.

Dr. Cattell was for many years a dominant figure in the governing councils of key scientific organizations, notably the National Academy of Sciences, the American Association for the Advancement of Science and the National Research Council. Most of the many societies to which he belonged honored him with election to their presidencies at one time or another. Among these were the American Association for the Advancement of Science, the American Psychological Association, the American Society of Naturalists, the Eugenics Research Association, the Society of Sigma Xi and the New York Academy of Sciences.

Dr. Cattell was a member of the board of trustees of Science Service since its foundation in 1921, and was its president from 1928 until 1937.

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AERONAUTICS

New Black Widow Plane Powerful Night Fighter

➤ CARRYING a deadly bite like its dangerous namesake, the Black Widow, a powerful night fighter plane announced recently by the War Department, is equipped with the latest devices. It may be assumed that, in common with all night fighters now in use by the various belligerent powers, aircraft detection equipment is included.

The deadly bite of the new night fighter may be felt by the Axis in the not-too-distant future, authorities predict.

Designated as the P-61, the Black Widow is heavily armored and armed, is powered by two Pratt and Whitney engines, possesses fairly long range, effective speed and climb characteristics. Exact details of the fighter's performance, of necessity, are secret.

More than three years of extensive research and development went into this effective aerial night combat weapon. Northrop Aircraft, Inc., of California was given the contract for the first model of the plane in January, 1941.

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ENGINEERING

Soft Tires Best in Sand

➤ SMALL, fully-inflated truck tires seen ordinarily on commercial motor vehicles are satisfactory on hard-surfaced roads, but are found by the Army to be unsuitable for cross-country travel and to provide traction in sand, mud and snow. Only large, soft tires furnish sufficient flotation in these conditions to stay near the surface and to give sufficient traction to move the vehicle forward. All-wheel drive is another essential.

Army experiences in operating trucks and other motor vehicles over roadless, cross-country terrain, and through sand, mud and snow, were discussed at the S.A.E. Detroit meeting by Lt. Col. J. E. Engler, of the U. S. Army Desert Training Command, Camp Seeley, Calif.

Relatively large tires, with aggressive tread design, adequate ground clearance, and some deflation are satisfactory for operating in mud and snow, said Col. Engler. In sand, tires should be twice the normal size, with considerable deflation.

Army cross-country tests, he said, have demonstrated that a 200-horsepower, 96,000-pound loaded tractor-trailer, such as is used on construction jobs, can barely move about in soft level sand. If rebuilt into an all-wheel drive vehicle, it will, with the same engine, not only travel through sand, but climb a 17% grade, or tow an additional trailed load of 17,000 pounds.

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Pin-up picture for the man who "can't afford" to buy an extra War Bond!

YOU'VE HEARD people say: "I can't afford to buy an extra War Bond." Perhaps you've said it yourself . . . without realizing what a ridiculous thing it is to say to men who are dying.

The very *least* that *you* can do is to buy an *extra* $100 War Bond. In fact, if you take stock of your resources, you will probably find that you can buy an *extra* $200 . . . or $300 . . . or even $500 worth of War Bonds.

Sounds like more than you "can afford?" Well, young soldiers can't afford to die, either . . . yet they do it when called upon. So is it too much to ask of us that we invest more of our money in War Bonds . . . the best investment in the world today? Is that too much to ask?

Let's all
BACK THE ATTACK

WE BOUGHT EXTRA WAR BONDS
4TH WAR LOAN

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone

Ersatz Prophet

➤ THE GROUNDHOG, who will soon be getting the blame for whatever goes wrong with the weather for the next six weeks, is no volunteer for this long-range forecasting job. He was drafted.

In Europe, the hedgehog is held responsible for the weather from Candlemas Day onward. Colonists arriving in America found no hedgehogs, so they transferred the job to the next handy animal—though the groundhog is very little like a hedgehog.

There's a joker in the game, too. The European hedgehog does come out of winter quarters for a look-see in mild weather. But our groundhog sleeps sturdily until about St. Patrick's Day, whatever the weather. So he never does see his shadow on Feb. 2.

Like many another harmless animal, the groundhog is called out of his proper name. He does live in a burrow in the ground, but he is no hog, nor any kin to one. Like that other miscalled mammal, the guinea pig, he is more nearly related to the rabbits, whom he resembles in his ceaseless nibbling at grass and other herbage. Under another alias, he is the woodchuck, that mythical manipulator of problematical quantities of timber. A third name, and really the more dignified and becoming to the animal, is marmot; but it is much less used.

The groundhog is a peaceable enough citizen most of the time, bickering mildly with his fellows, but letting the rest of the world alone. But if set upon by a four-footed bully he will turn to and show himself a "dour fechter." There is one case at least on record of a woodchuck giving a bulldog decidedly the worst of a battle.

Science News Letter, January 29, 1944

"CONTRA-PROP"—Two propellers which rotate in opposite directions are used on the $12,000-torpedoes of the U. S. Navy to keep them from rolling over and disturbing depth control. The picture on the cover of this SCIENCE NEWS LETTER shows a worker machining an airflask for a submarine torpedo. Official U. S. Navy photographs.

GENERAL SCIENCE

War Studies Aided By Fund's Appropriations

➤ THE PROBLEM of helping men rejected or discharged from the Army because of psychiatric disability, search for new germ-fighting substances from molds or fungi like penicillin, and post-graduate study of health and medicine by students from Latin America are among the projects aided by the Commonwealth Fund during its twenty-fifth year just concluded, it is announced with release of the Fund's annual report.

Appropriations for the year totalled $1,503,124.35. This, like the Fund's income for the year, was the smallest for many years. Chief change in the distribution of the Fund's gifts was a marked shrinkage in appropriations for the division of rural hospitals, due to necessary postponement of hospital building.

The man who comes back to civilian life with battle injuries, the report points out, finds ready sympathy and attention from the public. Less happy is the lot of the man rejected or discharged from the Army because of emotional and mental difficulties. Yet he is in no less need of prompt and skilful help. This thought prompted the Fund to aid the New York City Committee on Mental Hygiene which is making a systematic study of the problem in this city, and the Payne Whitney Clinic of the New York Hospital where an experiment in treatment and rehabilitation is being carried on.

The problem as a whole is too big to be met by private efforts but the Fund hopes that these two different studies may furnish valuable guide service for future action on the problem.

Looking to the future, the Fund in its report issues a word of warning and advice to the small voluntary hospitals, many of which in rural areas have been aided by the Fund. The war has enabled so many to pay for services they usually cannot afford that some of these hospitals find themselves "willy-nilly, operating in the black."

They are warned to guard against the possibility that "present prosperity may dry up the future sources of giving" and advised, among other things, "to refrain from greedy rate increases" and to plow their present surpluses back wherever possible into the improvement of physical and professional sources.

"Even with payrolls and farm prices at present levels," the advice concludes, "there are far too many country people in need of hospital care who are not getting it."

Science News Letter, January 29, 1944

Books of the Week

➤ THE ORGANIZATION for a balanced economy of the small nations occupying the Danube Basin is covered in a timely book entitled THE DANUBE BASIN AND THE GERMAN ECONOMIC SPHERE by Antonin Bash. The author shows that Germany's New Order could not solve the problem, but such an organization must be reached in a world setting. (*Columbia Univ. Press*, $3.50).

Science News Letter, January 29, 1944

➤ A READABLE BOOK for the layman who wants information about electrical and other energy used in American homes and industries. M. M. Samuels, who is now with the U. S. Rural Electrification Administration, is the author of POWER UNLEASHED. He is an electrical engineer and a scientist of high standing. (*Dorset House*, $3.50).

Science News Letter, January 29, 1944

Just Off Press

CHILDBIRTH WITHOUT FEAR: The Principles and Practice of Natural Childbirth—Grantly Dick Read—*Harper*, 259 p., $2.75.

CROSS SECTIONS OF NEW WORLD PREHISTORY: A Brief Report on the Work of the Institute of Andean Research, 1941-1942—Wm. Duncan Strong—*Smithsonian*, 46 p., illus., 70c, paper, Misc. Pub., Vol. 104, No. 2.

DIESEL LOCOMOTIVES: Electrical Equipment—John Draney—*Amer. Tech. Soc.*, 388 p., illus., $3.75.

FIGHTING FITNESS: A Premilitary Training Guide—C. Ward Crampton—*Whittlesey House*, 251 p., illus., $2.

THE FUNDAMENTALS OF PERSONAL HYGIENE: Including Their Practical Application to Healthful Living—Walter W. Krueger—*Saunders*, 315 p., illus., $1.75, 4th ed. rev.

THE GIRL MECHANIC'S MANUAL—Daniel J. Brimm, Jr., and Ernst Scheifele—*Pitman*, 166 p., illus., $1.75.

HOW TO SURVIVE ON LAND AND SEA—Issued by the Aviation Training Division, Office of the Chief of Naval Operations, United States Navy—*United States Naval Inst.*, 264 p., illus., $2.

INTRODUCING AFRICA — Carveth Wells — *Putnam's Sons*, 243 p., $2.50.

JOINT PROGRESS REPORT ON RESERVOIR EFFICIENCY AND WELL SPACING—*Committees on Reservoir Development* of *Standard Oil Co. and Humble Oil & Refining Co.*, 77 p., illus., free.

KOREA FOR THE KOREANS: Some Facts Worth Knowing and a Reading List—*Amer. Council Inst. of Pacific Relations*, 30 p., 15c.

THE PERMEABILITY OF NATURAL MEMBRANES—Hugh Davson and J. F. Danielli—*Macmillan*, 361 p., illus., $4.75.

PROCEEDINGS OF THE INDIANA ACADEMY OF SCIENCE—P. D. Edwards, ed.—*Indiana Academy of Science*, 229 p., illus., $3., Vol. 52.

SWEDEN: A Wartime Survey—Edited and Pub. in Sweden—*Amer.-Swedish News Exch.*, 250 p., illus., $2.

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•New Machines and Gadgets•

⚙ *AN ELECTRIC heating plate recently patented has two separate heating units. Four different degrees of heat may be obtained by using them singly, or in series or parallel.*

Science News Letter, January 29, 1944

⚙ *VACUUM TUBE hearing aids for the deaf, complete with amplifier tubes, earphone, cords and battery, are now available in a simplified design. The new design, it is claimed, permits sale of the hearing aid at a reasonable price.*

Science News Letter, January 29, 1944

⚙ *AN ILLUMINATED vanity case, small enough to be held in the palm of the hand, automatically lights up a flashlight bulb when opened. The lamp of this patented device is designed to focus of a spotlight on the face of the user.*

Science News Letter, January 29, 1944

⚙ *COSMETIC pencils at each end of a water-proof case enable soldiers to apply camouflage face-coloring rapidly. Pressing the finger on either pencil in this handy device, recently patented, causes the other pencil to protrude. A spring draws it back.*

Science News Letter, January 29, 1944

⚙ *MIDGET airplane heaters use high-octane gasoline which is vaporized and burned in the center of a column of spinning air. The type for small planes is shown in the photograph. Its major*

use is to de-ice windshields, prevent ice from forming on wings, and to keep bombsights, instruments and other equipment operating.

Science News Letter, January 29, 1944

⚙ *THICK LACQUER, or "dope," thinned by heating, is now sprayed on airplane bodies and wings, and airplane fabric is brushed onto the sticky surface. Three more coats of the dope are added. The four coats take the place of a dozen coats applied with earlier lacquers.*

Science News Letter, January 29, 1944

⚙ *TRANSPARENT plastic boxes are used by the U. S. Marine Corps to ship and hold small machine parts, such as nuts, bolts and screws. The plastic box protects the parts from moisture, sand, grease, poison gas and salt air, and enables the mechanic to see what he wants.*

Science News Letter, January 29, 1944

⚙ *"LIP MIKES" are midget microphones worn on the upper lip and held by bands around the ears. Soldiers can wear them under gas masks and dust respirators. They are designed especially for use in tanks and where the free use of both hands is desirable. The lip mike may be used in combination with earphone headsets.*

Science News Letter, January 29, 1944

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 192.*

Question Box

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What gases compose the atmosphere of Saturn's largest moon? p. 67.

BIOGRAPHY

In what professional fields did the late Dr. J. McKeen Cattell pioneer? p. 77.

CHEMISTRY

How can ozone best be used to control spoilage of meat in storage? p. 72.

ENGINEERING

What may enable the straphangers of 1945 to see out of streetcars? p. 73.

GENERAL SCIENCE

What states are sending boys and girls to the Science Talent Institute? p. 70.

MATHEMATICS

How does a mathematics method forecast a world government by 1950? p. 76.

MEDICINE

What glands may have a part in causing arthritis? p. 66.

What new burn treatment does not require the use of blood plasma? p. 68.

Where has a case of bone cancer been cured for 13 years? p. 68.

ORDNANCE

What device for sound camouflage has recently been patented? p. 72.

Why may tanks be on their way out as an instrument of war? p. 66.

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How many millions of years old is the reptile jaw found near Philadelphia? p. 73.

PHYSICS

How does the echo depth finder help the fisherman? p. 66.

PSYCHIATRY

What new method has been devised to screen out mentally unfit draftees? p. 69.

ZOOLOGY

What other names does the groundhog have? p. 78.

Where published sources are used they are cited.

Books

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